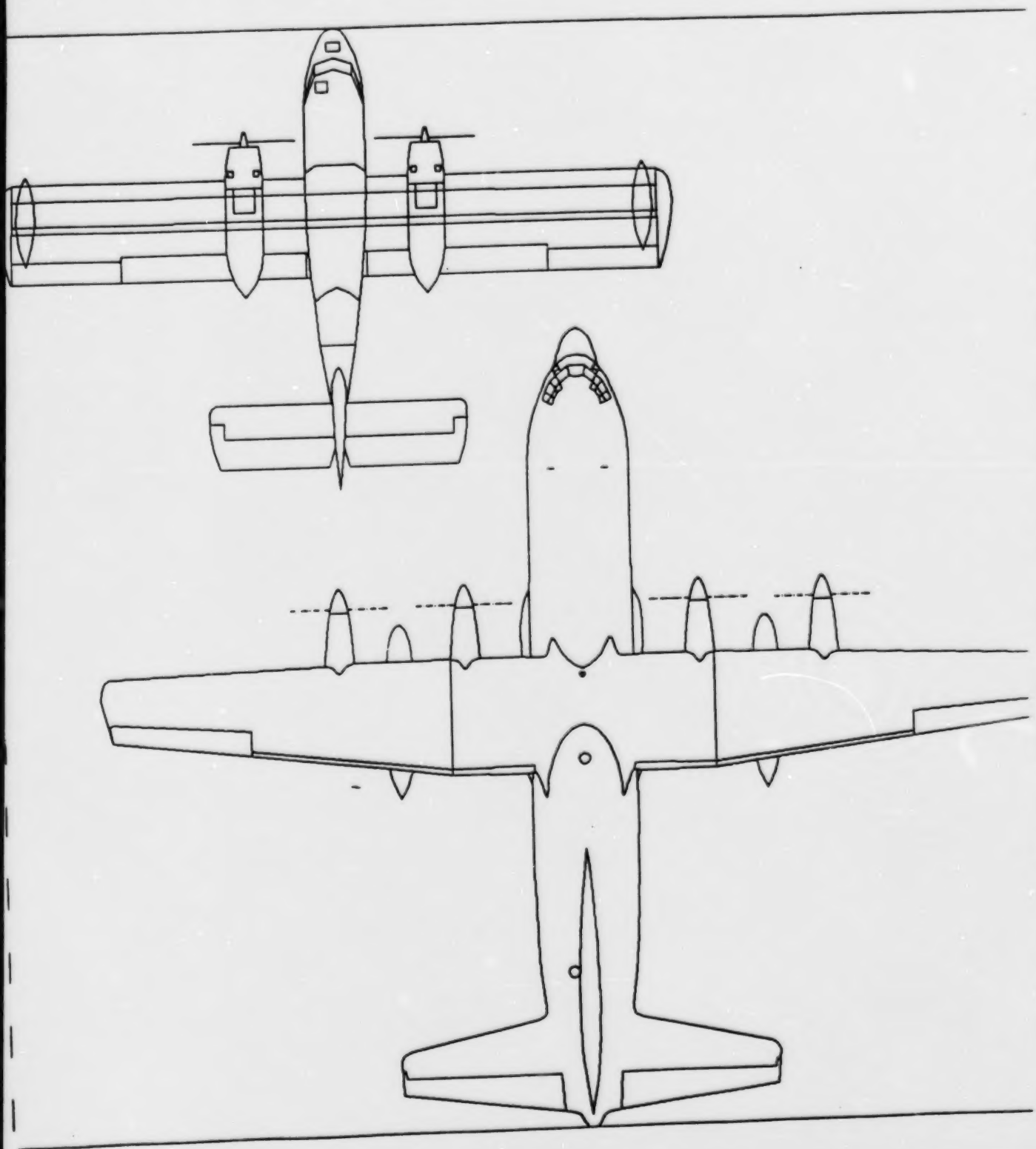
A Hangar Utilization Alternatives

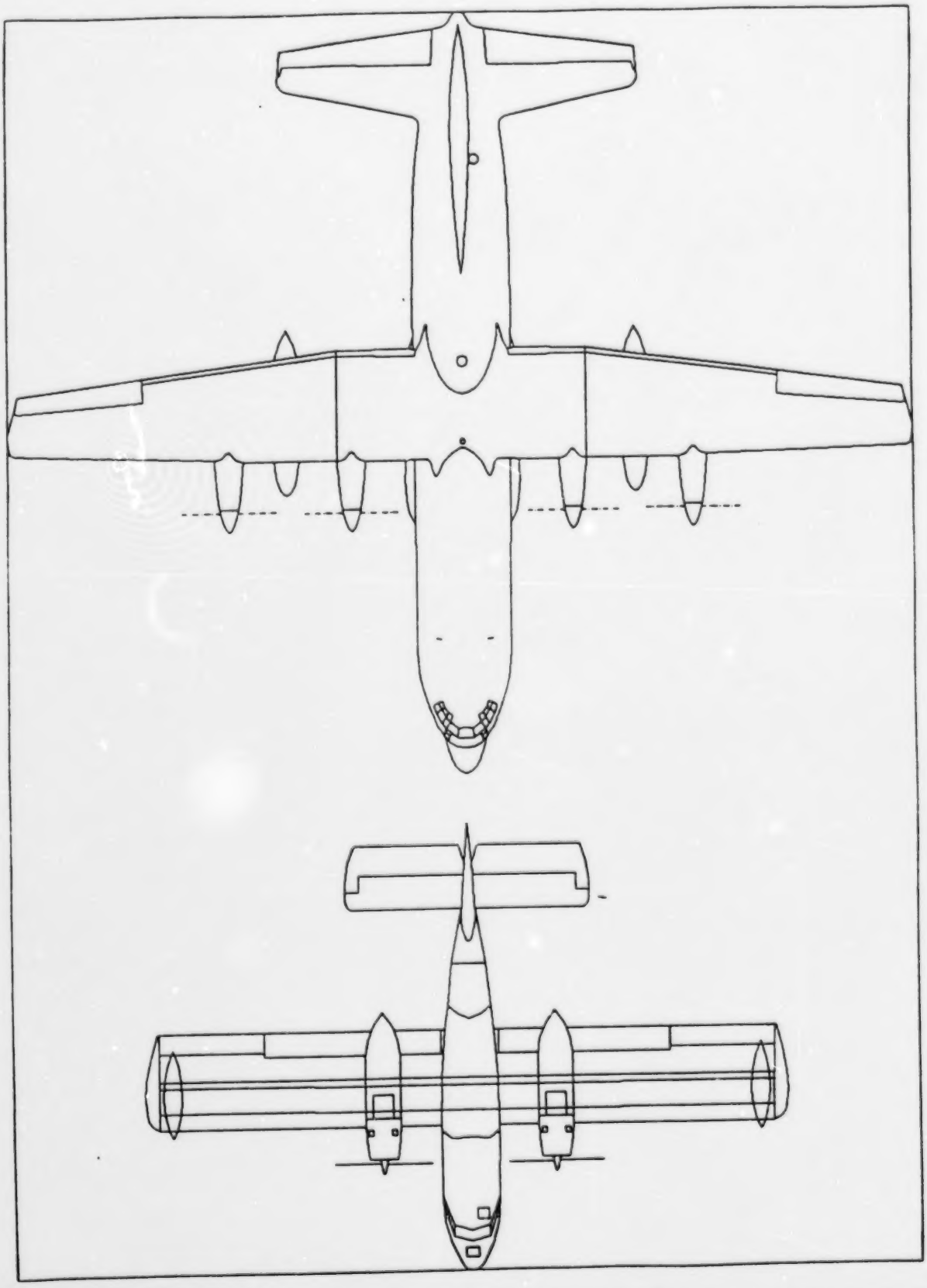
HANGAR UTILIZATION

Alternative 1



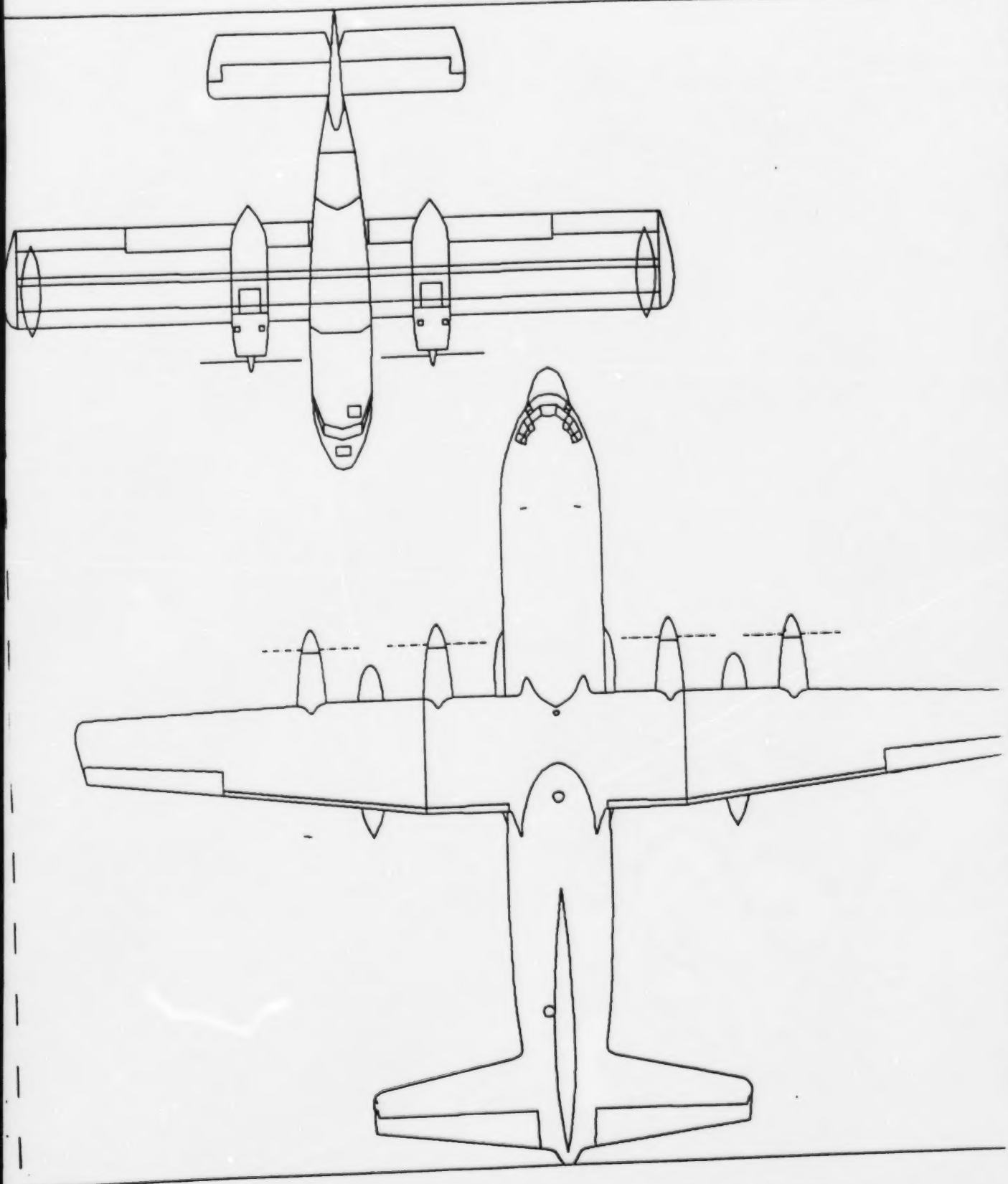
HANGAR UTILIZATION

Alternative 2



HANGAR UTILIZATION

Alternative 3



B Site Evaluations-Geotechnical

APPENDIX "B" - SITE EVALUATIONS - GEOTECHNICAL

YELLOWKNIFE AIRPORT

1.1 Site Conditions

Yellowknife is located in the discontinuous permafrost zone, on the north shore of Great Slave Lake.

Most of the area in the vicinity of the existing airport buildings has been cleared for many years. The areas are well drained and the near surface soils are trafficable to construction equipment during the thaw season.

The major soil units which are expected to underlie the proposed site include:

- silty sand,
- bedrock.

The proposed site is underlain by dense to very dense silty sand. The sand is moderately to highly susceptible to frost heaving. Frost heaving is not a major concern at this location however, since the depth of the groundwater table exceeds 5 metres. In contrast, frost heaving, as a result of a high water table, has caused maintenance problems for the shorter 09-27 (east-west) runway at Yellowknife Airport.

The sand is underlain by very hard granite bedrock. The bedrock surface is highly variable and could vary up to 20 m in depth below the site. Examination of the airphotos indicates that bedrock outcrops are present in the vicinity of, and possibly on, the proposed site.

Permafrost is generally absent in the vicinity of the existing airport buildings and is

not likely to be present below the proposed site for the hangar.

1.2 Taxiways and Aprons

The site grading requirements will be controlled by existing topography and surface drainage.

For conceptual design it is recommended that the pavement structure consist of 125 mm of Hot Mix Asphaltic Concrete placed on 250 mm of crushed rock base. The total thickness of the sub-base, base and wearing surface should be at least 1 m. Care should be taken to ensure positive drainage of surface runoff away from pavement structures.

Paved surfaces are expected to perform satisfactorily and no significant post construction settlements or frost heaving are anticipated.

1.3 Hangar Foundations

The hangar would be founded on either a concrete raft foundation placed on a compacted gravel pad, or on a perimeter strip footing. A concrete slab on grade floor would be used with the strip footing.

The floor slab elevation should be set to ensure positive drainage of surface water away from the building.

There is some risk that bedrock may be encountered at shallow depth in footing excavations. If bedrock is present at shallow depth over a portion of the building area, it will be necessary to found all foundation elements on bedrock.

FORT SMITH AIRPORT

Fort Smith is located about 300 km south of Yellowknife and is located within the discontinuous permafrost zone.

2.1 Site Conditions

The site was originally treed with spruce trees. The area was cleared several decades ago when the runway was constructed at Fort Smith. The site is well drained and trafficable to construction equipment during the thaw season.

No test hole data was available in the vicinity of the airport. However, based on an examination of airphotos, and information from test holes drilled in the Town, it is expected that the following soil units are present below the proposed site:

- lacustrine deposits,
- bedrock.

The site is underlain by lacustrine deposits which most likely consist of compact, interbedded silty sands and silt.

The silty sands and silts are underlain at depth by granite bedrock. The depth to bedrock is not known, but probably exceeds 10 metres and may exceed 30 metres.

The depth of the groundwater table is not known but most likely exceeds about 2 m.

Permafrost is present in the vicinity of Fort Smith, primarily in poorly drained areas where peat is present. It is unlikely that permafrost is present below the proposed site for the maintenance facility.

2.2 Taxiways and Aprons

The site grading requirements will be controlled by existing topography and surface drainage.

For conceptual design it is recommended that the pavement structure consist of 125 mm of Hot Mix Asphaltic Concrete placed on 250 mm of crushed base. The total thickness of the sub-base, base and wearing surface should be least 1 m.

Care should be taken to ensure positive drainage of surface runoff away from pavement structures.

Paved surfaces are expected to perform satisfactorily and no significant post construction settlements or frost heaving are anticipated.

2.3 Hangar Foundations

The hangers could be founded on either:

- concrete raft,
- perimeter strip footing, or
- driven steel piles.

The concrete raft should be placed on a compacted gravel pad.

A concrete slab on grade, placed on a compacted gravel pad may be used in conjunction with a perimeter strip footing or driven steel piles.

If a perimeter strip footing is used, it should be placed at a depth of at least 1 m below final grade. Insulation will be required around the outside perimeter of the building to protect the footing from frost action.

It is not possible to estimate the probable length of driven piles from the available information. For purposes of the conceptual design, it should be assumed that the driven piles could range up to 20 m in length.

HAY RIVER AIRPORT

Hay River is located about 200 km southwest of Yellowknife and is located within the zone of discontinuous permafrost.

3.1 Site Conditions

The site was cleared when the original runway was constructed several decades ago. The site is well drained and trafficable to construction equipment during the thaw season.

No test hole data was available in the vicinity of the airport. However, based on an examination of airphotos and information from test holes drilled in the Town, the following major soil units are expected below the proposed hangar site:

- alluvial deposits,
- silty clay till.

Alluvial (riverborn) deposits, consisting primarily of loose clayey silts are expected to be present below the site. The silts contain some soft to firm clay layers. Relatively thick alluvial gravel deposits are also frequently encountered within the silts.

The alluvial deposits are expected to be underlain by very stiff silty clay till. The depth of the clay till below this site is not known, but is expected to be within 6 to 10 m below ground surface. The till is believed to extend to depths of over 30 m.

The depth of the groundwater table is expected to range from 1 to 3 m below ground surface.

Permafrost is present in the vicinity of Hay River, primarily in areas which have not been cleared of vegetation. Typically the permafrost melts out 5 to 10 years after an area has been cleared. It is expected, therefore, that there will be no permafrost below the proposed site.

3.2 Taxiways and Aprons

The presence of near surface frost susceptible soils, coupled with a high water table results in significant frost action in this area. Periodic maintenance of the existing runway has been required in order to repair the effects of annual frost action.

Frost heaving of paved surfaces can be reduced by increasing the thickness of granular sub-base and ensuring positive drainage away from these structures. The use of insulation, to control frost penetration below paved surfaces can be considered, however its use under the thermal conditions encountered in Hay River is very uncertain. It is possible that the insulation may aggravate frost heaving by causing aggradation of permafrost below the insulation.

For conceptual design it is recommended that the pavement structure consist of 125 mm of Hot Mix Asphaltic Concrete placed on 250 mm of granular base. The total thickness of the sub-base, base and wearing surface should be at least 1 m.

Paved surfaces should perform satisfactorily, however frost heaving will occur and annual maintenance will probably be necessary.

3.3 Hangar Foundations

The hangar should be founded on driven steel piles. The piles should be driven into

the underlying silty clay till. The required length of the piles is uncertain but would probably range from 8 to 12 metres below existing ground surface.

A concrete slab on grade, placed on a compacted gravel pad should be used in conjunction with the piles. The near surface soils are compressible and may settle under the weight of the gravel fill. It would be adviseable to delay pouring the floor slab for as long as possible (say 12 months) after the fill has been placed.

Measures will be required to control frost heaving of foundation elements. The area below the floor slab should not be insulated. Insulation should be placed around the outside perimeter of the structure. A compressible void form (such as "Ethafoam") should be used below grade beams.

FORT SIMPSON AIRPORT

Fort Simpson is located about 400 km west of Yellowknife and is located within the discontinuous permafrost zone.

4.1 Site Conditions

The site was originally treed with spruce. The area was cleared several decades ago when the runway was constructed at Fort Simpson. The site is well drained and trafficable to construction equipment during the thaw season.

No test hole data was available in the vicinity of the airport. However, based on an examination of airphotos, and other information, it is expected that the following soil units are present below the proposed site:

- lacustrine deposits,
- silty clay till.

The site is underlain by lacustrine deposits which consist of compact, interbedded silty sands and silt. The near surface soils consist of silt which are highly frost susceptible. Frost heaving is not a major concern, however, because the water table is relatively deep.

The silty sands and silts are underlain at depth by silty clay till. The till is reported to be present at a depth of 5 to 7 metres.

The depth of the groundwater table is reported to be about 7 metres.

Permafrost is present in the vicinity of Fort Simpson, primarily in poorly drained areas where peat is present. It is unlikely that permafrost is present below the proposed site for the maintenance facility.

4.2 Taxiways and Aprons

The site grading requirements will be controlled by existing topography and surface drainage.

For conceptual design it is recommended that the pavement structure consist of 125 mm of Hot Mix Asphaltic Concrete placed on 250 mm of granular base. The total thickness of the sub-base, base and wearing surface should be least 1 m.

Care should be taken to ensure positive drainage of surface runoff away from pavement structures.

Paved surfaces are expected to perform satisfactorily and no significant post construction settlements or frost heaving are anticipated.

4.3 Hangar Foundations

The hangers could be founded on either:

- concrete raft,
- perimeter strip footing, or
- driven steel piles.

The concrete raft should be placed on a compacted gravel pad.

A concrete slab on grade, placed on a compacted gravel pad may be used in conjunction with a perimeter strip footing or driven steel piles.

If a perimeter strip footing is used, it should be placed at a depth of at least 1 m below final grade. Insulation will be required to protect the footing from frost action.

It is not possible to provide a reliable estimate of the probable length of driven piles from the available information. Based on the limited information available, it is expected that the piles could range from 10 to 15 m in length.

NORMAN WELLS

Norman Wells is located on the Mackenzie River, about 700 km northwest of Yellowknife. Norman Wells is located near the boundary between the zone of continuous and discontinuous permafrost.

5.1 Site Conditions

The proposed site is located in an area in which fill was placed in order to develop an aircraft parking apron for the airport. The fill was placed parallel to the runway,

and forms a slope, which is about 3 to 4 m in height, which bisects the proposed hangar site.

Vegetation has been stripped (or covered by fill) on the north half of the site. This area appears well drained and is trafficable to construction equipment during the thaw season.

The trees have been removed from the south portion of the site, but the peat is still in place. This area is moderately well drained but may not be trafficable during the thaw season.

Only very limited data was available with respect to subsurface conditions below the proposed site. The major subsurface soil units are expected to include:

- fill,
- silty clay till,
- clay shale bedrock.

As mentioned, 3 to 4 m of fill are present along the north half of the proposed site. The properties of the fill are not known.

The near surface native soil is expected to consist of silty clay till. The till is of low to medium plasticity and generally contains only minor amounts of excess ice. Vertical ice wedges, ranging up to 1 m in width and many metres deep, are present within the till.

The clay till is expected to be underlain by clay shale bedrock, which generally contains no excess ice. The depth to bedrock below the proposed site, based on limited data, is expected to be from 4 to 7 m below the original ground surface.

It is anticipated that the permafrost has degraded from below those portions of the

site from which the peat has been stripped. Permafrost (possibly ice rich) is probably present below those areas in which peat is still present.

5.2 Taxiways and Aprons

Significant depths of fill will be required in order to create a level area for the hangar and associated parking apron. It is essential that the fill below all areas which will be paved, be thoroughly compacted in order to minimize post construction settlements. The existing fill slope should be flattened prior to placing fill.

It is recommended that the fill be placed at least 2 years prior to paving in order to minimize settlements due to post construction consolidation of the fill and foundation soils.

For conceptual design, it is recommended that the pavement structure consist of 125 mm of Hot Mix Asphaltic Concrete placed on 250 mm of crushed rock base. This structure must be placed on a thaw stable compacted fill. The gravel fill (crushed limestone) below the pavement should be at least 1 m in thickness.

It should be noted that the permafrost in Norman Wells is relatively warm and sensitive to surface disturbance. Despite all precautions, it is possible that some settlements of paved surfaces may occur in the future. For example, settlement due to thawing of vertical ice wedges has been a maintenance problem for the existing runway.

5.3 Hangar Foundations

If the hangar is constructed on the north half of the site, in which permafrost is not expected to be present, the structure could be founded on driven steel piles. The piles should be driven through the fill and at least 3 m into the underlying bedrock. It may be necessary to prebore the pile holes into the bedrock. The concrete floor

may be placed on compacted crushed rock fill, at least 1 m in thickness. It can be expected, however, that some settlement of the floor will occur after construction, as the fill consolidates or as isolated ice lenses in the silty clay till melt out. It may be necessary to repair or replace some sections of the concrete floor.

If the structure is founded on driven steel piles with a slab on grade floor, it is essential that a comprehensive drilling and sampling program be carried out on the specific building site, in order to confirm that significant excess ice is not present in the overburden soils and within the underlying shale bedrock.

If the structure is founded on the south half of the site, below which permafrost may be present, it may be necessary to found the hangar on a concrete raft, with a cooling system similar to that described for the proposed Inuvik site.

INUVIK AIRPORT

Inuvik is located on the East Channel of the Mackenzie River, about 1100 km northwest of Yellowknife. The Town is located within the continuous permafrost zone.

6.1 Site Conditions

The area in the vicinity of the runway is vegetated with stunted black spruce and spagnum moss. The ground surface in undeveloped areas is poorly drained and not trafficable to construction equipment during the thaw season.

The soils below the proposed hangar site are expected to include the following major units:

- crushed rock fill,
- peat,
- silty clay till,

- clay shale bedrock,
- dolomite bedrock.

Crushed rock fill has been placed over the proposed site. The thickness of the fill is not known but is probably about 2 m.

Peat, having an average thickness of 0.3 m, but possibly ranging up to 2 m in thickness, is expected to be present below the fill. The peat is black, fibrous and highly compressible when thawed.

The peat is possibly underlain by a silty clay till. The till contains occasional boulders, cobbles and gravel. The clay till contains significant quantities of excess ice. Ice lenses ranging up to 1 m in thickness have been observed in some locations. The clay till is of low to medium plasticity and is very soft when thawed.

The silty clay till is possibly underlain by clay shale. In some locations in this area, the shale unit is absent. The clay shale is of medium to high plasticity and contains up to 10 percent excess ice by volume. Excess ice contents in the shale generally decrease with depth.

The shale is underlain by dolomite bedrock. The dolomite is exposed in the quarries at the west end of the runway, where it is hard, grey, light brown and red in colour and well jointed. The depth to dolomite bedrock below the airport has been found to range from 2 to 18 m below ground surface. The depth to dolomite bedrock is highly variable and the upper few metres of the dolomite bedrock are expected to be weathered and fractured. Open joints and fractures in the weathered dolomite can be expected to contain ice.

Sinkholes (due to the collapse of solution cavities within the dolomite) have not been reported in the vicinity of the airport, however the two circular lakes at the west end of the runway are suggestive of such features.

The maximum depth of thaw in undisturbed areas ranges from 0.5 to 1 m. The depth of thaw in crushed rock fill can range up to 3 m depending on water contents. Ground temperatures at a depth of about 6 m during the late fall, have been found to range from -1.8 to -3.1°C in areas where undisturbed peat is present.

6.2 Taxiways and Aprons

Crushed rock fill is required in all locations in this area in order to provide trafficability for construction vehicles.

In those areas where asphalt pavements are to be placed it is important to ensure that the annual thaw does not penetrate below the base of the granular fill into the underlying ice rich soils. Based on previous experience with the existing runway, it is recommended that the required minimum thickness of granular fill below pavement structures be 3.0 metres. This thickness can be made up of granular fill alone or, where required to achieve the design grade, a combination of granular fill and insulation. A thermal analysis should be carried out during detailed design to confirm the thickness of fill and insulation used below pavement structures.

The thickness of crushed rock fill placed on the proposed site is not known, but it is suspected it is less than 3 m. It is expected that it will be necessary to add fill and insulation in order to achieve a thaw stable base for the pavement structure. If fill is added, there may be difficulties in complying with maximum allowable grades on aircraft taxiways. In this regard, it should be noted that the apron for the AES hangar, which was constructed on less than 3 m of fill, has experienced significant thaw settlement since it was paved. It is recommended that paving be delayed for as long as possible (at least two thaw seasons) after the additional insulation and fill has been added, in order to reduce the risk of post construction settlements.

The design of the asphalt pavement structure for parking aprons and taxiways will depend on the maximum wheel loads and aircraft tire pressures. For conceptual

design, it is recommended that the pavement structure consist of 125 mm of Hot Mix asphalt concrete and 250 mm of crushed rock base. This structure must be placed on thaw stable compacted fill, as discussed above.

6.3 Hangar Foundations

The hangar can be founded on a concrete raft foundation placed on compacted crushed rock fill.

It will be necessary to install a cooling system below the raft in order to prevent heat from the hangar from thawing the ice rich soils below the compacted fill. Three systems can be considered:

- Forced air ventilation,
- Thermosyphons,
- Refrigeration.

Forced air ventilation consists of a series of air ducts through which air is blown during the winter months. Rigid extruded polystyrene insulation is placed between the air ducts and the concrete raft. For conceptual design, it may be assumed that 500 mm ducts, placed at 3 m centres, with 150 mm of insulation will perform satisfactorily. A minimum of 3 m of crushed rock fill would be required below the top of the concrete slab in order to prevent thawing the ice rich soil below the fill.

Thermosphyons consist of a sealed steel pipe which is partially filled with liquid carbon dioxide or ammonia. The liquid in the below ground portion boils and the vapour rises to the above ground radiator. The vapour condenses and flows back down under gravity to the below ground section. This cycle operates as long as air temperatures are colder than ground temperatures, as is generally the case during the winter. For conceptual design it may be assumed that thermosphyons will be spaced at 2.5 m, with an insulation thickness of 150 mm and a gravel fill thickness of 3 m.

Refrigeration pipes can be used to cool the area below the slab and prevent thaw degradation. Most units consist of a primary circuit which circulates freon while a secondary circuit circulates brine below the floor slab. The operating costs of a refrigeration system are generally high. However, because the system operates during the summer as well as in the winter, it is possible to reduce the thickness of gravel fill placed below the floor slab, to about 2 m.

The thickness of the existing fill on this site (about 2m) is less than normally required for either forced air ventilation or thermosyphon cooling systems. If the slab elevation cannot be raised because of limitations on taxiway gradients, it may be necessary to use the more expensive refrigeration system.

A thermal analysis will be required during detailed design to establish the minimum fill thickness and the most suitable cooling system for this particular site.

C Facility Specifications

OVERALL FEATURES SHEET

FACILITY: GNWT Hangar Facility

AREA: 4129 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
Asphalt Apron	xx
Concrete Apron	xx
Aircraft Tie Downs	xx
Explosion Panel	Flammable Storage
Floor Hardeners	xx
Loading Dock Equipment	Stores
Overhead Cranes	5 Ton Capacity
Jib Cranes	
Compressed Air	xx
Painting Operations	Shop
AFFF Fire Protection	
Drinking Fountains	xx
Underground Tanks	Used Oil/Solvent
Drench Shower/Eyewash	xx
Heating Systems	Forced Air
Engine Start Air	
Oil Separator	xx
Aircraft Wash Station	xx
Hose Bibbs	Exterior, Non-Freeze
400 Hz Electrical	xx
28V DC Electrical	xx
Lightning Protection	
Obstruction Lighting	xx
Exterior Lighting	Apron/Security
Building Grounding	xx
Emergency Power	
Aircraft Static Grounding	xx
P.A. System	xx
Security System	xx

COMMENTS:

1. Hangar doors - electrically operated, 600 V, protected bus duct conductor system.
2. GPU power supply - hangar area = 4, ramp area = 2
3. Equipment
   - Crane (bucket type)/cherry picker
   - Forklift 2500 lb. capacity, 10 foot lift, side shift carriage, battery charger
   - Office furnishings
   - Powered floor cleaner/washer
4. Exterior lighting to be equipped with photocells.
5. 350 Amp, 600/347 V, 3 ø electrical supply.
6. 10,000 gallon fuel tank.
7. 10,000 gallon water reservoir (where watermain supply is not available)
8. Underslab radiant heating should be considered in locations not subjected to permafrost conditions.

FEATURES SHEET

FUNCTION: Hangar

AREA: 2997 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	57300 mm
Width	51800 mm
Glazing	Double, Low E
Clear Height	12500 mm (min)
Overhead Doors	one
Special Doors	
Mandoors	xx
Wall Finish	Exposed Batt
Floor Finish	Light Relective
Ceiling	Exposed Batt
STRUCTURAL	
Floor Loading	L-100-30
Min. Column Spacing	7315 mm
Special Foundations	
Service Pits	
Floor Finish	Hardeners
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Double Sink
Compressed Air	Eight Outlets - 100 psi
Unit Heaters	
H + V	Forced Air
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	Four Catchbasins
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	HPS - 65 ft. Candles
Fluorescent Lighting	
Other Lighting	Task
Heat Detectors	xx
Intrusion Alarm	xx
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	xx
Speakers	xx
Baseboard	
Computer Outlets	

COMMENTS:

1. Hangar water supply - 3" single outlet (cold)
2. HW/CW outlets - Eight (8)

FEATURES SHEET

FUNCTION: Stores

AREA: 428 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	2400 W x 2400 H (2)
Special Doors	
Mandoors	xx
Wall Finish	Drywall
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	xx
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	xx
Speakers	xx
Baseboard	
Computer Outlets	xx

COMMENTS:

1. Stores to contain
   - Wheels area
   - Flammable storage/Oil stores
   - Purchasing office
   - Main stores
   - Shipping/receiving
2. Hangar to be used for storage of large items such as engine stands, ground equipment and engines.
3. Lift Table required, 6000 lb. capacity.
4. Store to have electrical services for computers, facsimile machine and photocopiers.

FEATURES SHEET

LOCATION: Northwest Territories

DATE: August, 1990

FUNCTION: Engine Q.E.C.

AREA: 56 m²

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	3000 W x 2400 H
Special Doors	
Mandoors	
Wall Finish	Concrete
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	Hardener
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Double Sink
Compressed Air	xx
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3ϕ, 60A	
600V, 3ϕ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Crane - Monorail, Hoist, 1 Ton

FEATURES SHEET

FUNCTION: Sheet Metal/Welding

AREA: 46 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	2400 W x 2400 H
Special Doors	
Mandoors	
Wall Finish	Concrete
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	Hardener
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	xx
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	Welding Exhaust
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Shop to accommodate tig welder and oxy-acetylene equipment.

FEATURES SHEET

LOCATION: Northwest Territories

DATE: August, 1990

FUNCTION: Machine

AREA: 46 m²

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	2400 W x 2400 H
Special Doors	
Mandoors	
Wall Finish	Concrete
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	Hardener
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Single Sink
Compressed Air	xx
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3ϕ, 60A	
600V, 3ϕ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Crane - Monorail, Hoist, 1 ton.
2. Equipment - Metal lathe.
3. Eyewash required in room.

FEATURES SHEET

FUNCTION: Avionics/Electrical Accessories

AREA: 46 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	Solid Core
Wall Finish	Drywall
Floor Finish	Vinyl Tile
Ceiling	Accoustic Tile
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	xx
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	xx
Speakers	
Baseboard	
Computer Outlets	xx

COMMENTS:

1. Nicad battery storage area to be included.
2. 220 Volt outlets - Two (2).

FEATURES SHEET

LOCATION: Northwest Territories

DATE: August, 1990

FUNCTION: NDT

AREA: 23 m²

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	
Wall Finish	Drywall
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	xx
Sanitary Drainage	
Compressed Air	xx
Unit Heaters	
H + V	Supply Only
HVAC	
Exhaust Fans	xx
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3ϕ, 60A	
600V, 3ϕ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Magnaflux tester.

FEATURES SHEET

FUNCTION: Cleaning/Degreasing

AREA: 9 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	Double Mandoor
Mandoors	
Wall Finish	Concrete
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	xx
Unit Heaters	
H + V	Supply Only
HVAC	
Exhaust Fans	xx
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Equipment - Self contained varsol spray booth 1200 x 1200.
2. Provide solenoid connection between compressed air supply and exhaust fan.

FEATURES SHEET

FUNCTION: Battery

AREA: 5 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	
Wall Finish	Drywall
Floor Finish	Concrete
Ceiling	Drywall
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Single Sink
Compressed Air	
Unit Heaters	
H + V	
HVAC	
Exhaust Fans	xx
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Single Sink to be stainless steel.

FEATURES SHEET

FUNCTION: Paint

AREA: 28 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	2400 W x 2400 H
Special Doors	
Mandoors	xx
Wall Finish	Concrete
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	Hardener
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Single Sink
Compressed Air	xx
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	xx - Explosion Proof
Fluorescent Lighting	
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx - Explosion Proof
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Single Sink - stainless steel.
2. Tanks - Paint stripping
   - Acid etching
   - Alodine
   - Hot water parts washing/rinse tank
3. Forced warm air drying rack.
4. H + V to be separate unit designed for spray booth.

FEATURES SHEET

FUNCTION: Mechanical/Electrical

AREA: 37 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	xx
Wall Finish	Drywall (rated)
Floor Finish	Concrete
Ceiling	Exposed Structure
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	xx
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Compressor to be large capacity (turbine) type c/w air dryer and filters.
2. Main electrical switchboard, communications board and intrusion alarm system.
3. Hot water boiler system.

FEATURES SHEET

FUNCTION: Administration

AREA: 408 m²

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	Double, Low E
Clear Height	2600 mm
Overhead Doors	
Special Doors	
Mandoors	Solid Core
Wall Finish	Drywall
Floor Finish	Carpet
Ceiling	Acoustic Tile
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	
Sanitary Drainage	
Compressed Air	
Unit Heaters	
H + V	
HVAC	xx - Zone Control
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	xx
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	xx
Intrusion Alarm	xx
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	xx
Speakers	
Baseboard	xx
Computer Outlets	xx - UPS System

COMMENTS:

1. Lobby - 600 x 600 acoustic tiles, pot lights, ceramic floor tile.
2. Administration areas - 1200 x 600 acoustic tile, recessed light fixtures.
3. Lighting - 80 ft. candles.
4. Exterior mandoor - insulated, closures
5. Built-in safe.
6. Lunchroom - drinking fountain, vinyl tile, sink/cupboard unit, electrical power for vending machines, refrigerator, microwave.
7. Boardroom - dimmable light fixtures
8. Inspection office/library - vinyl flooring
9. Acoustically insulate from hangar.

FEATURES SHEET

FUNCTION: Washrooms

AREA: (Included in Administration)

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	Solid Core
Wall Finish	Drywall
Floor Finish	Ceramic Tile
Ceiling	Drywall
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	xx
Sanitary Drainage	Vanities
Compressed Air	
Unit Heaters	
H + V	Supply Only
HVAC	
Exhaust Fans	xx
Infrared Heating	
Supply Fans	
Floor Drainage	xx
Special Drainage	
Fire Extinguishers	
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	Surface
Other Lighting	
Heat Detectors	
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3φ, 60A	
600V, 3φ, 100A	
Telephone Outlets	
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. GFI receptacle in each washroom.
2. Lockers - Twenty (20) half units.

FEATURES SHEET

FUNCTION: First Aid

AREA: (Included in Administration)

LOCATION: Northwest Territories

DATE: August, 1990

REFERENCE	DESCRIPTION
ARCHITECTURAL	
Length	
Width	
Glazing	
Clear Height	
Overhead Doors	
Special Doors	
Mandoors	Solid Core
Wall Finish	Drywall
Floor Finish	Vinyl Tile
Ceiling	Acoustic Tile
STRUCTURAL	
Floor Loading	
Min. Column Spacing	
Special Foundations	
Service Pits	
Floor Finish	
MECHANICAL	
Water Supply	xx
Sanitary Drainage	xx
Compressed Air	
Unit Heaters	
H + V	xx
HVAC	
Exhaust Fans	
Infrared Heating	
Supply Fans	
Floor Drainage	
Special Drainage	
Fire Extinguishers	
Sprinklers	
ELECTRICAL	
HID Lighting	
Fluorescent Lighting	xx
Other Lighting	
Heat Detectors	
Intrusion Alarm	
Duplex Receptacles	xx
208V, 3Φ, 60A	
600V, 3Φ, 100A	
Telephone Outlets	xx
Speakers	
Baseboard	
Computer Outlets	

COMMENTS:

1. Provision for single bed.
2. Sink/cupboard unit.